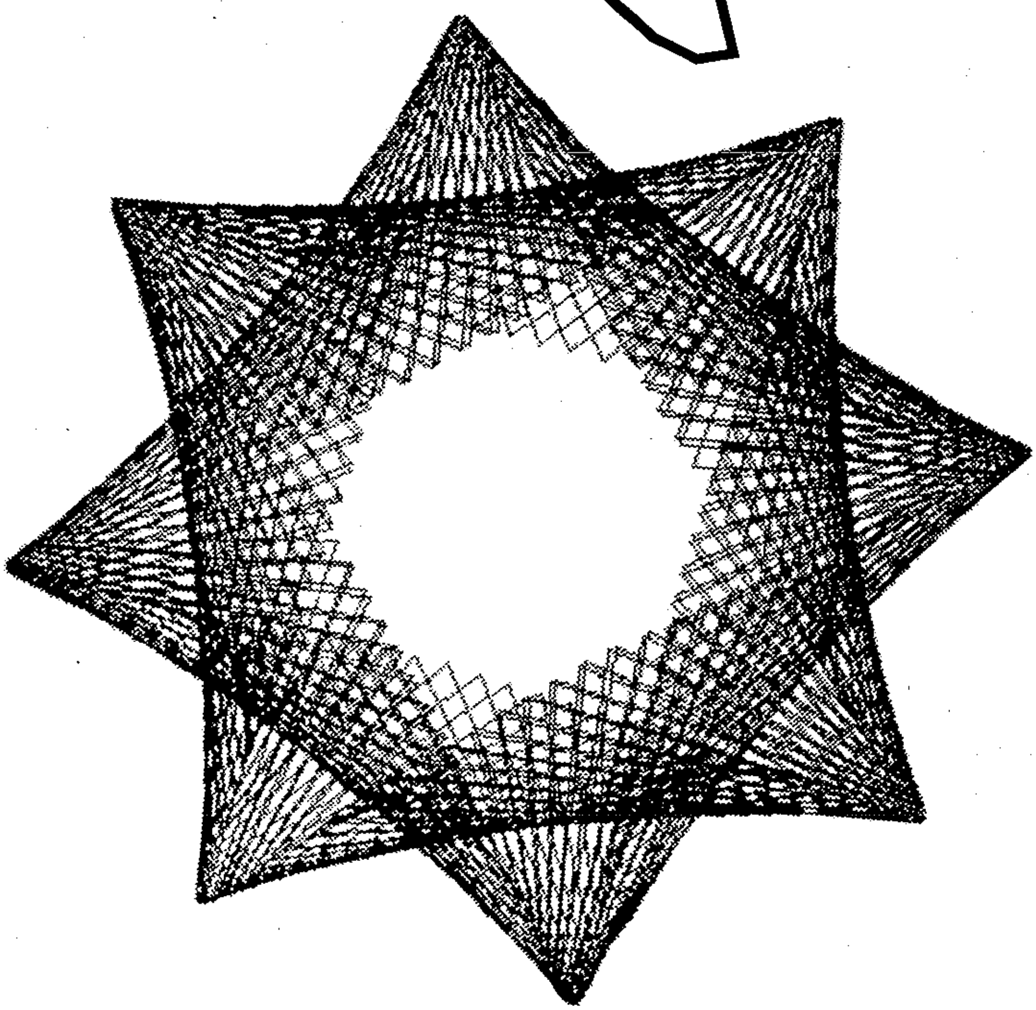
The Texas Mathematics Teacher



Texas Council of Teachers of Mathematics
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The **TEXAS MATHEMATICS TEACHER**, the official journal of the Texas Council of Teachers of Mathematics, is published four times each year, in October, January, March, and May. Editorial correspondence and regular article manuscripts should be addressed to the editor, as listed above. Manuscripts for the *Voices from the Classroom*, *Student Voices*, and *Lone Star News* sections should be addressed to the appropriate Associate Editor.

Potential authors should adhere to the following guidelines:

(1) An article for Voices from the Classroom should be relatively short, and contain a description of the activity sufficient in detail to allow readers to incorporate it into their teaching, including a discussion of appropriate grade level and prerequisites for the lesson. Whenever possible, these articles should include camera-ready activity sheets that can be directly photocopied by classroom teachers.

(2) Manuscripts should be word-processed or neatly typewritten, double-spaced with wide margins on $8^1/2$" x 11" paper. No author identification should appear on the manuscript. Illustrations should be carefully prepared in black ink on separate sheets, the original without lettering and one copy with lettering added.

(3) Submit the original and four copies. If possible, please include a Macintosh or IBM $3^1/2$" diskette containing the manuscript.

(4) Include a cover letter containing the following information: author(s) name, address, affiliations, and phone number; intended level; and, if a disk is submitted, name and version number of computer word-processing or graphics packages used.

As soon as possible after refereeing, authors will be notified of a publication decision. Originals of articles not accepted for publication will be returned to the authors. Two copies of the issue in which an author's manuscript appears will be sent to the author automatically.

We also need

(1) **Referees** for articles! Interested mathematics educators, whether classroom teachers, supervisors, or collegiate personnel, are encouraged to send their names, addresses, and level(s) of interest (elementary, middle-school, secondary, and/or collegiate/teacher preparation) to the Editor, at the address above. An individual can expect to referee two or three manuscripts per year.

(2) Dates, times, and contact people for activities, workshops, and conferences that would be of interest to mathematics teachers.

(3) Interesting miscellanea for margin notes.

SUBSCRIPTION and **MEMBERSHIP** information is on the back cover.

TEXAS MATHEMATICS TEACHER

TEXAS COUNCIL OF TEACHERS OF MATHEMATICS

Affiliated with the National Council of Teachers of Mathematics

November 1995

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ON THE COVER: Art prepared by Jon Mayfield, student from James Bowie High School, Austin

The Big C in TCTM

The C in TCTM may represent the word "Council," but many other words come to my mind when I think of being a part of a council of mathematics teachers.

Challenge

The teachers of Texas face many challenges. We are asked to meet the needs of the changing school day—block scheduling and other ways to change the time periods in which we teach. Our students are facing the challenges of a different society and of a technological world. We must help them meet these challenges by changing the way we teach mathematics.

Change

We are all forced to change what and how we are teaching to meet the needs of our students. This change should be not only a change in methodology, but also a change in curriculum.

Curriculum

Secondary teachers must now teach algebra to everyone. This requirement affects the curriculum of the elementary and middle school, because schools must be sure that their students are prepared for algebra by including algebraic thinking and problem solving activities in their curriculum. The secondary teacher and the university and community college professors must prepare their students for the technological world by incorporating the use of the calculator, the computer, and discrete mathematics into the curriculum.

Collaboration

Sharing of ideas and the collaboration of the mathematics teachers from kindergarten through college would benefit not only the students, but the teachers. Let us encourage conversation not only across the grade levels, but also across the disciplines.

Communication

The Texas Mathematics Teacher, the official journal of TCTM, can be a tool used by the Texas mathematics teachers to communicate ideas. Through the journal we can share methods to meet the challenges facing the teacher—the changing student, the changing curriculum, the changing school day , new methods of assessment, ideas for interdisciplinary teaming, proposals for vertical teaming, and designs for community involvement. The journal can also serve as a way for the Texas affiliated NCTM groups to communicate with the mathematics teachers in their areas.

Cooperation

The Texas Mathematics Teacher journal can serve as a communication tool only if we have your cooperation. Send in your activities for *Voices from the Classroom*, news for the *Lone Star News* section, dates of your affiliated group meetings, conferences, or contests for the Calendar, reports on your affiliated groups activities, and student-written activities or reports for *Student Voices*. With your cooperation we can help to improve mathematics education in Texas.

Diane McGowan
President
Texas Council of Teachers of Mathematics

Slopes of Perpendicular Lines

Guillermo Martinez, Robert Gonzalez
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When students in a college algebra class question the truth of the concept that the product of the slopes of any two perpendicular lines is –1, there needs to be some demonstration of the truth of the concept. Given here are two such methods. Both make use of similar triangles and use only the elementary concepts of algebra and geometry.

METHOD I

Let l_1 and l_2 be two nonvertical perpendicular lines intersecting at A. Consider the two similar right triangles ABC and DAC in Fig. 1 with sides w, x, and h.

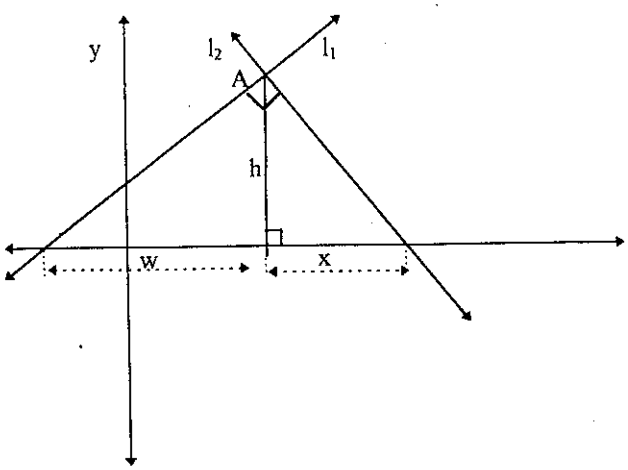

Figure 1

Then, from elementary geometry, one has $h^2 = wx$. Denote the slopes of l_1 and l_2 by m_1 and m_2, respectively. Since

$$m_2 = \frac{-h}{x} \text{ and } m_1 = \frac{h}{w},$$

then,

$$m_1 m_2 = -\frac{h^2}{wx} = -1,$$

which is the desired result.

METHOD II

Now consider the two perpendicular lines l_1 and l_2. Let y_1 and y_2 be the lengths of two segments dropped from points P and Q perpendicular to the x-axis, as show in Fig. 2.

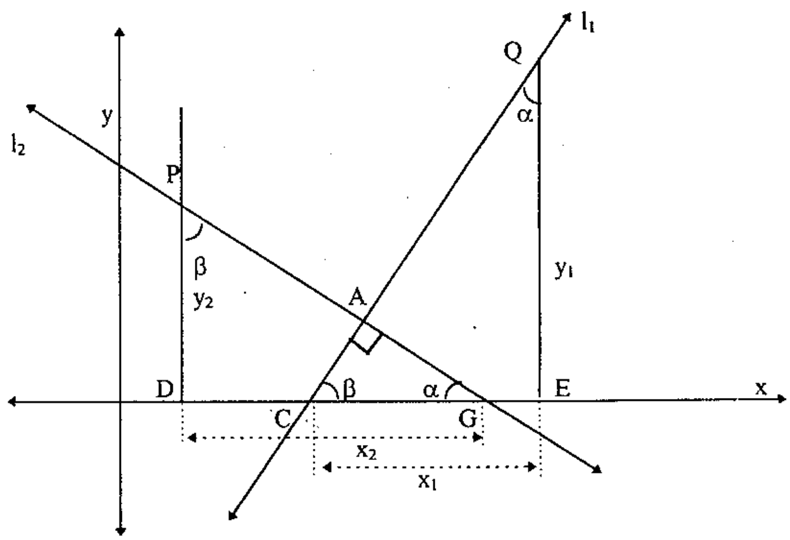

Figure 2

The three triangles with angles labeled α and β are all similar. Notice ΔCQE ~ ΔCGA since they are both right triangles with a common angle β. Also, ΔPGD ~ ΔCGA since they are right triangles with a common angle α. Therefore, ΔCQE ~ ΔPGD. This implies that

$$\frac{y_1}{x_1} = \frac{x_2}{y_2}, \text{ and } y_1 y_2 = x_1 x_2.$$

Let m_1 be the slope of l_1 and m_2 be the slope of l_2. Then

$$m_1 = \frac{y_1}{x_1}, \; m_2 = \frac{-y_2}{x_2},$$

and $m_1 m_2 = -\dfrac{y_1 y_2}{x_1 x_2} = -1$, the desired result.

These two methods used to demonstrate that the product of the slopes of two perpendicular lines is –1 can provide a source of information from which students can draw when undertaking more complex proofs using analytical geometry.

The Use of Calculators in the Elementary Grades: A Rationale and Some Examples of Use

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College Station, Texas

Much controversy exists over the use of calculators in elementary school mathematics. Some people fear that the use of calculators in K-8 school mathematics will interfere with the learning of computational skills and with the understanding of mathematical concepts. Saxon (in Dick, 1988), for example, strongly recommends delaying the use of calculators in school mathematics until the first or second year of high school to ensure that students acquire arithmetic skills and concepts. Saxon also is concerned that if students are allowed to use calculators before the first or second year of high school, they will have little incentive to learn basic computational skills. For the most part though, research on the use of calculators in teaching and learning mathematics has shown that the fears of those who share Saxon's view are not well-founded.

While early studies on the use of calculators in the teaching and learning of mathematics indicated that there were few, if any, negative effects on the acquiring of basic mathematical skills, reviews of these studies were not able to conclude definitively that calculators improved student achievement and attitude in mathematics, because an inferential approach was not used (Hembree and Dessart, 1986). Meta-analysis of seventy-nine early studies dealing with the use of calculators in mathematics in grades K-12 by Hembree and Dessart (1986) imparted statistical credibility to the findings of these early studies. Overall, Hembree's and Dessart's findings indicate that use of calculators significantly improved performance of paper and-pencil skills for average-ability students except for students in grade 4, whose basic skills were negatively affected by use of calculators. The sole negative finding for fourth grade students, however, was not supported by a subsequent study (Riley, 1992) where calculators were used in grades 3-6 mathematics. Using the Iowa Test of Basic Skills, Riley found that there were no significant differences in achievement in grade 4 in computational skills, concept development, problem solving, and overall mathematics achievement between students using calculators and students using paper-and-pencil skills. According to Hembree and Dessart (1986), paper-and-pencil skills of both low-ability and of high-ability students were not affected by the use of calculators. Understanding concepts across ability levels and grade levels was not significantly affected by use of calculators. Improved achievement in problem-solving testing with calculators was attributed to a computational advantage of students with calculators and to their choices of better solution strategies. Furthermore, using calculators during examinations improved retention of skills. Additional findings of the meta-analysis indicated that attitude toward mathematics and self-concept in mathematics were positively and significantly affected by the use of calculators.

These findings indicate that the positive effects of using calculators in the learning and testing of mathematics in elementary grades should be exploited. Currently the focus on the use of calculators in school should be on finding ways to best use them rather than on whether or not they should be used. The use of calculators in mathematics instruction is important in problem solving, particularly for computation in problems dealing with real data. Use of calculators facilitates exploration, development, and reinforcement of mathematical concepts and in discovering patterns. Without calculators, students with poor computational skills will spend much time in computation exercises and will not have the opportunity to learn the use of computation in problem solving (Souviney, 1994).

In problem solving, calculators allow students to concentrate on finding solutions without being distracted by possible lengthy calculations. They are able to engage in the process of problem solving rather than on the production of intermediate or final numerical results. When dealing with problems that use real data and require tedious computation, the use of a calculator can keep students focused. How a computation is derived is not as important as knowing when and how to use a calculation in problem solving. "Insisting that all children must be excellent pencil-and-paper calculators puts the emphasis in the wrong place – on the means, rather than on the ends, of calculation" (Usiskin, 1978, p. 413).

CALCULATORS IN PROBLEM SOLVING

Calculators take the focus away from computation and place it on the use of computations. In the following problem, students can use calculators for computation and concentrate on problem-solving strategies.

EXAMPLE 1

Prepare a monthly budget for a family consisting of a father, a mother, and three school-age children. This family's income is based on the father's income only. He works 40 hours a week for minimum wage, which is currently $4.25 an hour. The budget should take into consideration all ordinary expenses such as:

housing (mortgage payment, rent)
food (including lunch money for father and children if they don't take lunches prepared at home)
transportation (car payments, gasoline, car maintenance, bus fare, etc.)
health care
school supplies
utilities (electricity, natural gas)
phone
other expenses you think the family may have

The solution to this problem requires more than computational skills; it also involves finding realistic estimates of expenses. The problem has more than one solution as well as more than one solution path. The use of calculators will help students stay focused on other aspects of the problem rather than simply on the computation required to solve the problem.

Mathematical problem solving should not be hampered by lack of mastery of a computational skill. There are, unfortunately, numerous students who are kept at a computational level of mathematics learning, using paper-and-pencil algorithms in drill-type problems, to the extent that little time is devoted to problem solving.

These students may or may not master basic skills through drill exercises that are not applied in problem solving. For them, mathematics may remain a fragmented, low-level, useless skill. Students who have not acquired sound arithmetic skills in eight years of mathematics, that is, those in remedial high school classes, may not make any mathematical progress without the use of calculators. "For such people the calculator is not a crutch; it is the only way to get a right answer" (Usiskin, 1978, p. 413).

For students who do well in mathematics and who are comfortable with problem solving, the use of a calculator can propel them even further. They can explore increasingly complex mathematical problems that may challenge their computational skills. The calculator can help these students obtain the numeric answer they need to solve more interesting and more complex problems. For example, students can understand and use the square root of a number without having to learn to compute the square root with the paper-and-pencil algorithm.

Estimation, computation, and number properties can be explored, developed, and reinforced with the use of calculators. When estimation values are not supported by calculator computation, students then question their own thinking. They are more prone to look for an alternate solution until they obtain reasonable results (Finley, 1992). An example of an activity for two players and one calculator in which students use their number sense and practice number facts is described by Williams and Stephens (1992, p.233).

EXAMPLE 2

Procedure: An activity for two players and one calculator

1. Player A enters a three-digit number less than or equal to 900.
2. Player B must reduce the given number to 0 in at most five steps, using any of the four basic operations of arithmetic and a single-digit number at each step.

If one player enters the number 703, the other player may reduce the number to 0 in the following sequence:

703–3 =
700/7 =
100/5 =
20/5 =
4–4 =

Exploring mathematical ideas can help students engage in mathematical thinking. Acquiring an interest in mathematics can be fostered by means of problems that have intrinsically interesting characteristics such as the following one detailed by Bolt (1987, p.42).

EXAMPLE 3

479 has the interesting property that when it is:

divided by 6 it leaves a remainder of 5
divided by 5 it leaves a remainder of 4
divided by 4 it leaves a remainder of 3
divided by 3 it leaves a remainder of 2
divided by 2 it leaves a remainder of 1

Which is the smallest number with this property?
(Answer: 59)

The problem above also is an example of an activity through which students discover patterns in mathematics. This type of activity is important because patterns help build mathematical concepts such as number, numeration, operations, relations, functions, and problem solving (Bright, Lamphere, Usnick, 1992). Another example of an activity in which students can work with patterns is described below (Bolt, 1987, p. 21):

EXAMPLE 4

Compute the following

1 x 8 + 1 =
12 x 8 + 2 =
123 x 8 + 3 =

Extend and explain the pattern.

Many more examples exist that make use of calculators to enrich and broaden the mathematics curriculum.

CONCLUSION

Do children really need six to eight years to be well-grounded in basic skills? How well do paper-and-pencil algorithms model the meaning of operations? Elimination or a de-emphasis of paper-and-pencil algorithms will have a major effect on the mathematics curriculum, since a major part of the curriculum of the third to eighth grades will be removed (Shumway, 1992). Even without the radical change of elimination of paper-and-pencil algorithms, a de-emphasis, particularly of those algorithms that do not adequately model the operation they represent, may allow the time to enrich mathematics curricula so as to promote a deeper understanding of mathematical concepts and better applications of computation skills and strategies. All students deserve the opportunity to learn mathematics in the most productive way.

If two decades of research is not convincing enough that using calculators in teaching and learning mathematics improves mathematics ability, then consideration must be given to the realistic need for students to be technologically prepared for the workplace in the future. In real jobs, people are not expected to do paper-and-pencil calculations. It is possible that only in a classroom setting are paper-and-pencil methods of computation and problem solving used extensively. The workplace has always taken advantage of technological advances. Proponents of the calculator as a teaching and learning tool are not advocating that a foundation in basic skills be replaced by reliance on calculators, but that the long-lasting goal of acquiring mathematical concepts and their application to problem solving can be hastened and enriched by the use of calculators. Today's students need to learn how best to use the calculator as a tool. Adding exercises in which students use calculators for the sole purpose of using technology in mathematics instruction only begins to tap the power of calculators in learning mathematics. To teach mathematics with such a tool, mathematics curricula need to be changed in order to integrate the use of calculators into the content of instruction whenever it will improve understanding. For example, if teaching a computation algorithm with a calculator leads to better understanding of a mathematical process involved, then, clearly, calculators should be used to teach the algorithm.

The primary objection to the use of calculators in teaching and learning mathematics is that students will not learn the "basics." Research on the use of calculators has shown that they do not detract from the learning of basic skills in mathematics. Rather than hindering the learning of basic skills, the use of calculators can help students attempt more interesting, complex problems that enable them to develop higher thinking skills. With the use of calculators, the level of frustration in problem solving is decreased, improving students' attitudes toward mathematics, fostering persistence in problem solving, and, ultimately, raising the level of mathematics learning.

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The following two classroom activities are published by the Texas Education Agency. Copies of the complete Guidelines for each grade may be purchased for $4.00 from the Publications Distributions Office. Texas Education Agency, 1701 North Congress Avenue, Austin, Texas 78701.

Guidelines for Teaching Grade 2 Mathematics

EE: 3C
Related EEs: 1A, 1D, 1E, 3A, 3B
Grade 3 TAAS Objectives: 1, 10, 11, 12, 13

OBJECTIVE

The student will use concepts of base ten place value to determine the value of eggs found in an egg hunt.

ACTIVITY

Don't Count Your Chips Before They Hatch.

MATERIALS

Paper eggs (red, white, blue); place value mats; base ten materials; plastic eggs (40); red, white, blue poker chips (two sets of 100); baskets (one for each group); prizes; calculators.

PROCEDURE

INTRODUCTION

1. Set aside the following materials for each group:
   - place value eggs made of construction paper: large blue eggs marked with 100, 200, . . . 900; medium red eggs marked with 10, 20, . . . 90; and small white eggs marked with 1, 2, . . . 9
   - set of base ten materials and place value mats and one calculator
   - places or paper on which to write 3-digit numbers.
2. In advance, place 2-3 chips in each plastic egg. Do not use more than 10 blue chips in all 40 eggs. Hide the plastic eggs.
3. Tell the students they are going to have an egg hunt. They will get prizes if they can determine the value of the eggs they find.
4. With students in groups of three, determine group roles (egg maker, base ten materials manipulator, recorder). One student shows a 3-digit number using paper eggs, one builds the number with concrete manipulatives, and one records the number in two ways. Have students rotate the roles so that all will have a chance to do each job.
5. Write a 3-digit number on the chalkboard (such as 567), Ask, "What does each digit in 567 represent? What are two ways you can write 567? What happens when there are no tens? Show 305 with your eggs. What happens when there are no ones? Show the number 350 with your eggs."
6. After this discussion, tell students that they get to hunt for eggs with place value chips inside: White = 1, red = 10, blue = 100. (Note that the chips are in the same colors as the corresponding paper eggs).
7. The students in the groups of three now have roles of basket carrier, exchanger, and recorder. When the students open the eggs back in the classroom, they are to arrange the chips on the place value mat. As a group, they are to determine the total points contained in the egg. If exchanges need to be made, the exchanger takes the appropriate chips to the bank (the teacher or an assigned student).
8. Chart the class results on the chalkboard and give prizes (stickers or certificates for the most eggs collected, highest number of points, most cooperative, correct totals, etc.).

EXPLORATION:

- How is your group deciding to share the work?
- What is the value of a blue chip? Red? White?
- What exchanges did your group have to make?
- How did you know when to exchange chips?
- How did you arrive at your total?
- What happened to your total when you found a blue chip in an egg? A white chip? A red chip?
- What patterns did you notice in the ways the total changed each time?
- What other strategies could you have used?
- Can you use the calculator in any of your strategies? If so, how?

EXTENSION:

- Play Beanbag Toss. Mark off a game board on the floor with tape and label the areas with 1, 10, or 100 points. Toss the beanbags onto the gameboard. Use a slate or paper to record the total points.
- Make an abacus using egg carton lids, plastic straws and beads or interlocking cubes (red, white, and blue to continue the colors in the egg hunt). Explore 10 more, 10 less, 100 more, 100 less.

SUMMARY

- How are the chips in the eggs different from using the base ten materials?
- What are the advantages of using different colors rather than different sizes to represent each place value?
- What are the disadvantages?
- What happened when you had 10 or more white chips?
- What happened when you had 10 or more red chips?
- What do 10 red chips represent?
- What do you think would happen if you had 10 blue chips?
- Would you have been able to have an egg hunt with base ten materials.?
- When you were hunting the eggs, were you able to tell if an egg contained ones, tens, or hundreds? Why or why not?
- Could you tell how much the egg was worth by guessing how many chips were in it? Why or why not?
- If you had a choice to use these chips or other concrete place value models as money, which would you choose? Why?
- What else could you use to represent ones, tens, and hundreds?
- Did you use the calculator in any of your strategies? If so, how?

ASSESSMENT

QUESTIONS:

(See summary questions.)

OBSERVATIONS

- Were students using place-value strategies for determining the value of each egg?
- Were students using place-value strategies for determining the totals of their eggs?

TASKS:

- Represent a given 3-digit number with some kind of physical materials.
- Design an odometer device. Represent situations such as, "I had 585 miles on my car yesterday. Today I drove 36 more miles. What should the odometer read today?"
- Write a journal entry comparing the use of base ten materials with the use of colored chips to represent numbers.

Guidelines for Teaching Grade 4 Mathematics

EE: 4H
Related EEs: 1A, 1B, 1C, 4A
Grade 3 TAAS Objectives: 1, 6, 7, 10, 11, 12, 13

OBJECTIVE

The student will use properties of operations and problem-solving strategies to do mental calculations, extended beyond fact recall.

ACTIVITY

Hooked on Problem Solving

MATERIALS

Number tiles with the digits 1-9 (or numbered squares of paper); 5 x 7 index cards; markers; tape

RESOURCES

"Hook Your Students On Problem Solving" by Gloria J. Bledsoe in *Arithmetic Teacher*, December 1989.

PROCEDURE

INTRODUCTION

1. Have students arrange their numbered squares into a 3 x 3 array. Ask, "Does the sum of the first two 3 digit numbers equal the third 3 digit number? (Probably not!) Is it possible to arrange the digits so that the sum of the first two numbers does equal the third 3-digit number?"
2. Have students try to create such an arrangement. Hint: Regrouping is an important consideration. For example:

$$\begin{array}{r} 291 \\ +\,384 \\ \hline 675 \end{array}$$

EXPLORATION:

- As students begin to find solutions, have them record the solutions on 5 x 7 index cards with heavy felt-tip markers. Post the solutions. This gives students a chance to notice duplicates, put the cards in categories, and begin to search for patterns.
- Once a fairly large collection of data is posted, ask, "How many solutions do you think might be possible? Can you find a pattern that might make the task easier?"
- Record the patterns noticed as "Conjectures" and ask students to search for counterexamples to test their conjectures. Conjectures that can be logically explained or for which no counterexample can be found can be listed under "Generalizations." Possible examples of conjectures:
  - It is always necessary to regroup to find a solution.
  - Neither a 1 nor a 2 can be the hundreds digit of the answer.
  - The digits in the answers add up to 18. (This pattern is difficult to notice at first. To speed up the process, ask students to concentrate on the sums.)

EXTENSION:

- Write a summary statement explaining how to solve the problem.
- It is possible to arrange the digits in some way to create problems using operations other than addition? Experiment and record your findings.

SUMMARY

- Explain how you arrived at your conjectures and generalizations.
- Can anyone find a counterexample we haven't thought of?
- How many possible solutions did you find?
- How did you use your patterns and conjectures to find more solutions?
- What strategies did you use to verify that you had found all the solutions?

ASSESSMENT

- teacher observation of student participation in exploration and discussion
- student's explanations of strategies to determine patterns
- students' identification and justification of patterns that led to conjectures and generalizations
- students' use of conjectures and generalizations to find new solutions
- student-generated counterexamples to disprove false conjectures.

A Vertical Team Mathematics Project

Diane McGowan and Dr. Lloy Lizcano
James Bowie High School, Austin, Texas

The science department at our school has sponsored a Science day for the elementary students on our vertical team for two years. In the spring of 1995 we decided to include mathematics and language arts in this day. Third-, fourth-, and fifth-graders were invited to spend four hours at Bowie High School. They were moved to a different activity every twenty minutes. To involve our mathematics students in the activity we assigned the precalculus and calculus students a spring project that would allow them to design an activity for the students. The project information sheet that we gave to the students is shown on page 11.

Our students worked with groups of four to six elementary students. The following were some of the students' activities:

Teddy and Will built a miniature golf course on a four-by-eight sheet of plywood. They had small wood blocks placed at strategic positions. They demonstrated that the golf ball would reflect off of the first block onto the second block and off of that into a hole. They found that many of the students were able to understand the concept of an angle of reflection.

Juanita and Miguel designed a board game that required basic math skills such as addition, subtraction, multiplication, and division. The students had to answer the questions in a certain amount of time to advance along the board.

Kat, Andy, and Sara taught the students about polyhedrons. The students were given a net to construct a polyhedron, cut out the net, and constructed and colored the polyhedrons.

Joel, Michael, Erin, and Matthew designed a spatial activity. They built shapes from blocks and took photographs of the four sides and the top. The students were shown the photos and asked to construct the block formation.

Tim and Aaron had a station at which they showed the students how to create their own tesselations by cutting out a shape from one side of a square, translating it to the opposite side, and taping the piece to the other side of the square. The students made tesselations and colored their designs.

Christina and Sora helped the students to develop the concept of area by giving them shapes, along with one-inch squares to use in estimating the area. Other students used centimeter cubes to develop the concept of volume.

Tracy, Mandy, and Linda gave a topology lesson by having the students construct a Mobius Strip.

Two outdoor games were designed. One game was patterned after Simon Says with questions being mathematical. Another game was designed based on the Twister game.

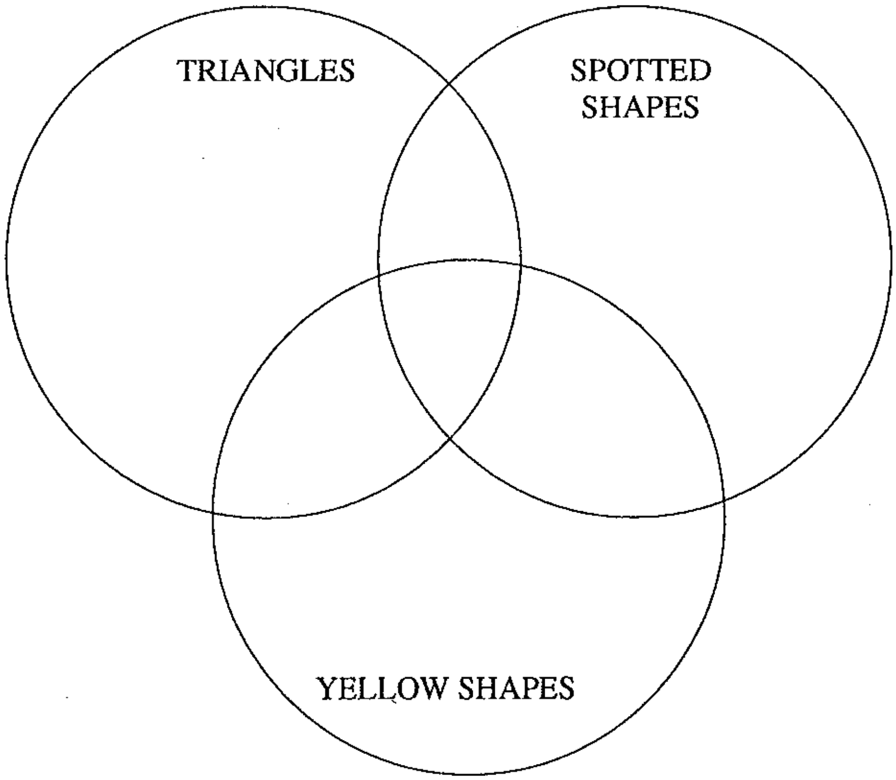
The teachers who accompanied the elementary students enjoyed the activities. One teacher asked if she could have the Ring Sort activity designed by Melody, Sara, and Shivani. This activity is given on a following page.

Even if a school does not have a vertical team day, students may design activities. The teachers could make arrangements to take a team of students to the elementary school and present the activities in the elementary classroom. We found that our students enjoyed teaching the younger students. The elementary and high school students enjoyed interacting with each other. Our students created many fun activities to teach, reinforce, and practice mathematical concepts.

RING SORT

Supplies: Rings made from poster board or hula hoops
Plain triangle in each of four colors, spotted triangle in each of four colors, assortment of other shapes in the four colors, assortment of other spotted shapes in the four colors.

Procedure: Lay the rings on the floor so that they are overlapping. Label one of the rings *yellow*, one *triangles*, and one *spotted shapes*. Give the students the shapes and tell them to place them in the appropriate section. Some of the triangles were both spotted and yellow and would have to be placed in the intersection of all three rings.



EXTENSIONS:

- Give the students cards with numbers from one to twenty. Make three overlapping rings, label one ring *multiples of* 2, the second ring *multiples of three*, and the third ring *other*.
- Give the students cards which contain addition or subtraction problems. Tell them to sort them into the ring labeled with the answer to the problem.
- For older students give them triangles and rectangles cut out of centimeter grid paper. Label the rings *triangles, rectangles,* and *figures of a specified area.*
- Give students circles and squares of different colors in three sizes, large, medium, and small. Label the rings *large, small,* and *red.* Tell the students to sort the shapes.

VERTICAL TEAM PROJECT

MATH TEACHING ACTIVITY

Students may choose to develop a teaching activity to be used during the Vertical Team Day. In developing your teaching activity, you must integrate your lesson with the grade-level specific math curriculum, but you may go beyond the established curriculum and demonstrate the mathematics behind the lesson in an age-appropriate fashion.

Your lesson must include:

1. ***Background research and statement of objectives:*** The research must include sources of essential elements for elementary math being taught as well as library or textbook references for sources of information. The statement of objectives must describe realistic and measurable outcomes for student performance and understanding.

2. ***Materials and supplies:*** A complete list of materials and supplies needed must be compiled. You might consider developing a lesson plan using materials that could be donated, like orange juice cans, balloons, marshmallows, toothpicks, etc.

3. ***Step-by-step procedure for the hands-on math activity:*** Math teachers know that math is best taught when students are *doing* math. Therefore, you must design your lesson around an *activity* that illustrates and demonstrates the concepts you are trying to teach.

4. ***Assessment:*** You must be able to determine how well your students grasped your lesson by designing some form of assessment that measures their level of understanding of the concepts presented. This assessment can include a product that is turned in, a questionnaire or worksheet that must be filled out by the student, or any other form of assessment.

5. ***Feedback:*** You must evaluate the success of your lesson by analyzing how well the students performed on your assessment. You must develop some means of communicating your analysis to your teacher.

6. ***Reteaching technique:*** You need to design at lease one method of reteaching this lesson to those students who did not grasp the concepts adequately. Your analysis of their assessment should provide some insight into the amount of reteaching necessary. You should think ahead and try to design a reteaching activity just in case it is needed and time permits you to employ it with your students.

7. ***Extension activity:*** Some students will want to continue with the lesson at home. Design an "at home" project that students could do if they wish.

Connecting One-Variable Equations and Two-Variable Equations: An Introduction

Dr. Paul A. Kennedy
Department of Mathematics
Southwest Texas State University
San Marcos, TX 78666

The multiple representations in algebra are particularly important in a curriculum that is enhanced by technology. In particular, students must make the connection between equations in one-variable and equations in two-variables, in the sense that the one-variable equation is a specific instance of the two-variable case. This connection is particularly important when students begin to solve more complex problems with a graphics calculator. Here we introduce the connection, making it accessible to students who have just completed work with integer operations. Formal "undoing" equation-solving techniques are not even prerequisite in this setting. Students only need a good sense for variable and how to solve by substitution or "guess and check." This activity can easily be done in a "pre-algebra" setting with middle school students and certainly with Algebra I students. To ensure that students make the desired connection, a teacher may lead the students in a class discussion of problem 1.

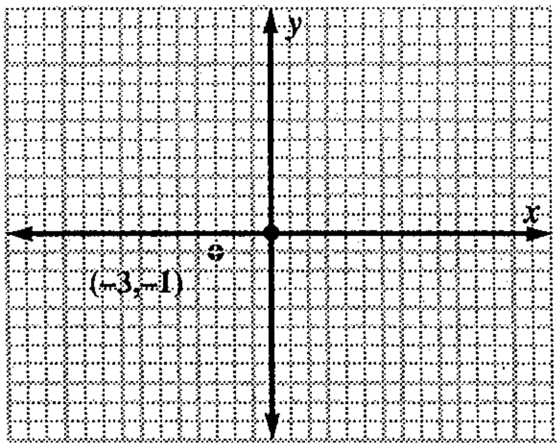
(continued next page)

ACTIVITY: Solving Equations Graphically

In this activity you will learn to graph equations in two variables. You will also find the solutions to equations in one variable on graphs of equations in two variables.

Finding Solutions on a Graph.

1. You can graph equations using a table of integer values and a four-quadrant grid. For the equation 6 = x + 2, the point (–3, –1) is called a *solution* to the equation. The point is shown on the graph below.



x	y = x + 2	Ordered Pair
–3	y = –3 + 2 = –1	(–3, –1)
–2	y = –2 + 2 = _	(–2,)
–1		
0		
1		
2		
3		

a. Complete the table and graph. Draw a straight line through the points on the graph

b. For what x-value does the y-value equal –2? Use the graph to find the answer.

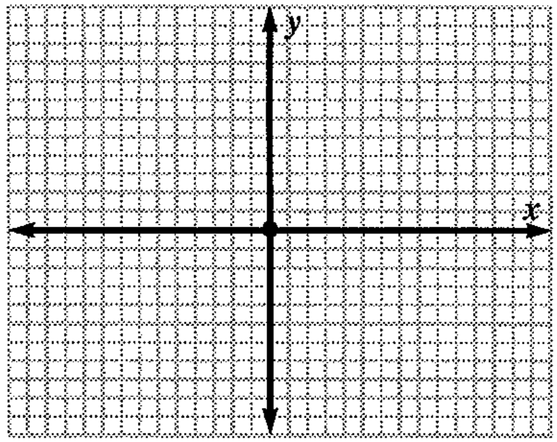
c. Solve the equation x + 2 = –2 using guess and check.

d. How does your answer compare with Part (b)? Explain your answer.

e. Use the graph to find the solution to the equation: x + 2 = –4.

2. Complete the following items for the equation y = x –4

x	y = x – 4	Ordered Pair
–3	y = –3 – 4 =	(–3, _)
–2	y =	(–2,)
–1		
0		
1		
2		
3		



a. Complete the table and graph. Draw a straight line through the points on the graph

b. For what x-value does the y-value equal –2? Use the graph to find the answer.

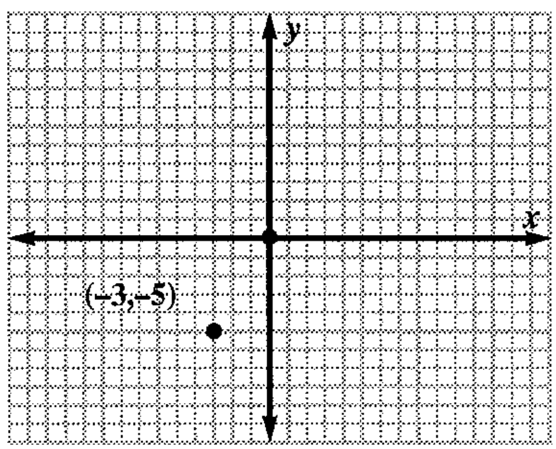
c. Solve the equation x – 4 = –2 using guess and check.

d. How does your answer compare with Part (b)? Explain your answer.

e. Use the graph to find the solution to the equation: x + 2 = –4. Solve the equation using the addition property.

3. The table and graph show the equation y = 2x + 1

x	y = 2x +1	Ordered Pair
–3	y =2(–3) +1 =	(–3, _)
–2	y =	(–2,)
–1		
0		
1		
2		
3		



a. Complete the table and graph. Draw a straight line through the points on the graph

b. For what x-value does the y-value equal –2? Use the graph to find the answer.

c. Solve the equation 2x + 1 = –2 using guess and check.

d. How does your answer compare with Part (b). Explain your answer.

e. Use the graph to find the solution to the equation: 2x + 1 = –6. Solve the equation using the properties.

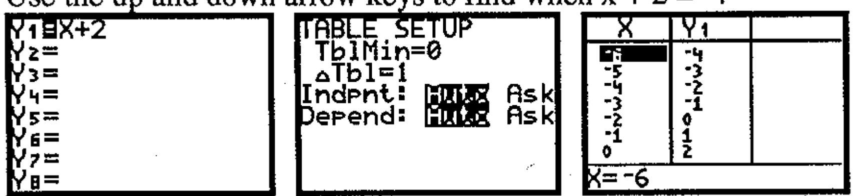
Using a Calculator to Solve Equations

4. You can use the TABLE and GRAPH features of your calculator to find solutions to equations in one variable.

GRAPHICS CALCULATOR NOTE #1

You can solve the equation x + 2 = - 4 using the TABLE feature of your graphing calculator.

- Press [Y=] and set $Y_1 = x + 2$.
- Set the TABLE [2nd] [WINDOW] to read integers ΔTbl=1
- Use the up and down arrow keys to find when x + 2 = -4



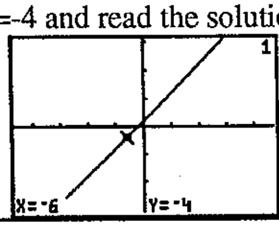
From the table you can see that x=-6 is the solution to the equation x + 2 = -4.

5. Use the TABLE to find the solution to x + 2 = –2

GRAPHICS CALCULATOR NOTE #2

You also can solve the equation x + 2 = - 4 using the GRAPH and TRACE and features of your graphing calculator.

- To set the WINDOW to read integers press [ZOOM] 6 (Standard) [ZOOM] 8 (Integer) [ENTER] .
- TRACE to y=-4 and read the solution, -6.

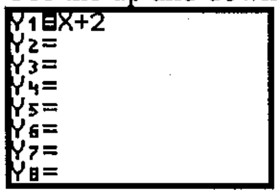


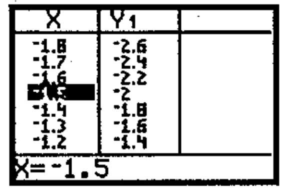
6. Use TRACE to find the solution to x + 2 = –8

GRAPHICS CALCULATOR NOTE #3

You can solve the equation 2x + 1 = - 2 using the TABLE and GRAPH features of your graphing calculator.

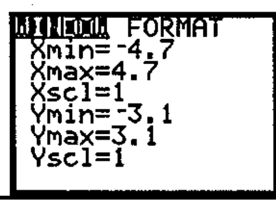
- RESET you calculator.
- Press [Y=] and set Y_1 = 2x + 1.
- Set the TABLE [2nd] [WINDOW] to read decimals ΔTbl=.1
- Use the up and down arrow keys to find when 2x + 1 = - 2.

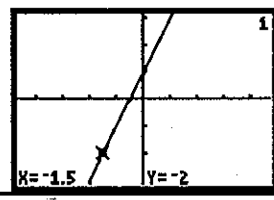




From the table you can see that x=-1.5 is the solution to the equation 2x + 1 = - 2.

- To set the WINDOW to read decimals press [ZOOM] 6 (Standard) [ZOOM] 4 (Decimal).
- TRACE to y=-2 and read the solution, -1.5.

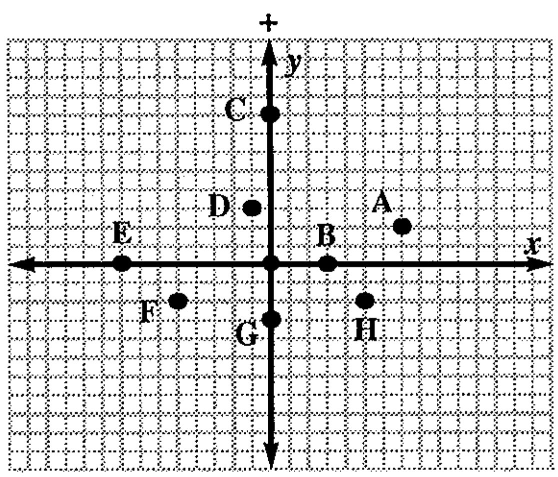




7. Use the TABLE and GRAPH features to find the solution to 2x + 1 = 2
8. Use the TABLE and GRAPH features to find the solution to 2x – 1 = –3

Self Test

1. Label each point with its coordinates, (x, y). Each grid mark represents one unit.

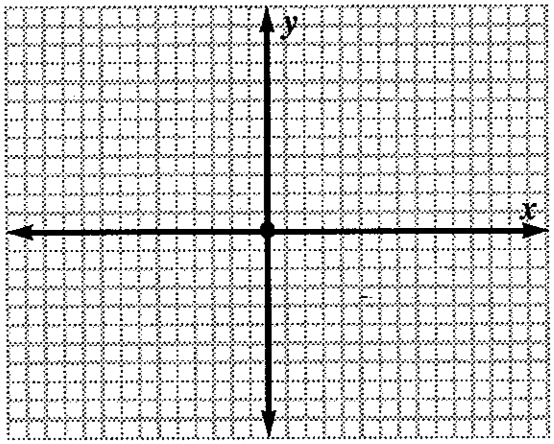


2. Explain how you can use the graph of the equation y = x + 1 to find the solution to the equation x + 1 = –3.
3. Explain how you can use the TABLE and GRAPH features of the graphics calculator to find the solution to the equation x + 1 = –3.

Consider the equation y = 3x – 4.

4. Complete the table and graph.

x	y = 3x – 4	Ordered Pair
–3	y = –3(–3) – 4 =	(–3, _)
–2	y =	(–2, _)
–1		
0		
1		
2		
3		



5. For what x-value does the y-value equal 2? Use the graph to find the answer.
6. Solve the equation 3x – 4 = 2 using guess and check.
7. How does your answer compare with Exercise 5? Explain your answer.
8. Use the graph to find the solution to the equation: 3x – 4 = 8.
9. Use the TABLE feature of your graphics calculator to solve 3x – 4 = –10.
10. Use the GRAPH and TRACE features of your graphics calculator to solve 3x – 4 = –16.

Mathematics and Science

Dr. Lloy Lizcano
James Bowie High School, Austin, Texas

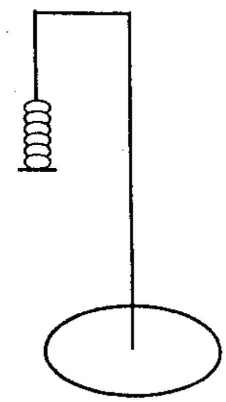
One of my major objectives in the classroom is to help students understand the concepts of mathematics and their applications to everyday life. One strategy for achieving this objective is to connect the math lesson to a topic of study in another discipline. Through work with an interdisciplinary team, I have had the opportunity to develop some lessons to make these connections.

This activity is appropriate for a first- or second-year algebra class. A demonstration of the interpretation of the slope of a line as a rate involves a simple experiment. The students work in a group situation using a spring assembly borrowed from the science department. The students attach weights to a spring and measure the displacement of the spring. After taking several measurements, the data is organized in a chart and then graphed. A line of best fit is approximated using a piece of uncooked spaghetti. The students may, at a later time, plot the same data on a graphing calculator and have the calculator compute the line of best fit. The students find the slope of the line and relate it to the displacement of the spring per unit weight.

The teacher leads the students in a discussion about other springs and what might be the slopes of the lines for ballpoint pen springs, seat cushion springs, shock absorbers, and any others which the students would like to mention. The next discussion focuses on other linear functions – cost of a traffic ticket as a function of speed, cost of clothes as a function of age, cost of an airline ticket as distance travelled increases. In each case, the students determine the meaning of the slope as a rate of change of y per unit of x.

Students gain a greater understanding of the meaning of slope of a line by doing the experiment, collecting and graphing the data. They are motivated to participate in class, they see the relevance of math in its application to familiar situations, and they become participants in their own learning. This lesson can be extended to more advanced math by using functions that are non-linear and by relating the slope of the tangent line to the instantaneous rate of change and to the derivative of the function.

Materials for each group:
- Activity sheet
- Ring Stand
- Spring
- Weights
- Metric Ruler
- Uncooked spaghetti



ACTIVITY SHEET 1
INSTRUCTIONS FOR THE SPRING EXPERIMENT

1. Before you begin this experiment, just pull gently on the spring. Do you think that it is hard to pull or easy to pull? ______________________

   How does it compare with some other springs with which you are familiar? Write at least 3 examples.

2. Set up the spring assembly. Attach the spring to the ring stand hook.

3. Measure the length of the spring with no weight attached. Record the measure on the data sheet in the space labeled "initial length."

4. Add a weight to the spring. Measure the length of the spring. Record the amount of weight and the length of the spring on the data sheet. Subtract the initial length from the new length to get the displacement. Record the displacement.

5. Repeat step #4 three times, recording the measurements each time.

6. When the chart is filled, plot the points on the graph grid.

7. Use the spaghetti to find the line of best fit. Mark two of the data points which fall on the line.

8. Use the two points to find the slope of the line of best fit. m = __________________

9. Use the line of best fit to try to "guess" what the displacement of the spring would be if we put 2 kg of weight on the spring. ______________________

10. How much weight would be required to get a displacement of one inch? ______________________

11. If the line had a slope of 4, would the spring be harder to pull or easier to pull? Explain.

12. What kind of spring might have a slope of 1/2? Explain.

13. What slope might each of the examples you named in question #1 have?

______________________ ______________________

____

Phrases that use the word "per" are often rates. For example, miles per hour is a rate at which we travel. If you were taking a trip, you might record the number of miles you had travelled at the end of each hour of your trip. Then you might make a graph using miles on the y-axis and hours on the x-axis. If you were to find the line of best fit, then the slope of that line would be the average number of miles per hour you travelled on the trip.

14. Name three other phrases that use the word "per."

15. Is each of your examples a rate? Why or why not?

16. Describe the data that you would collect in order to graph one of your examples above.

17. Describe the graph you would make.

18. What would the slope of the line of best fit represent?

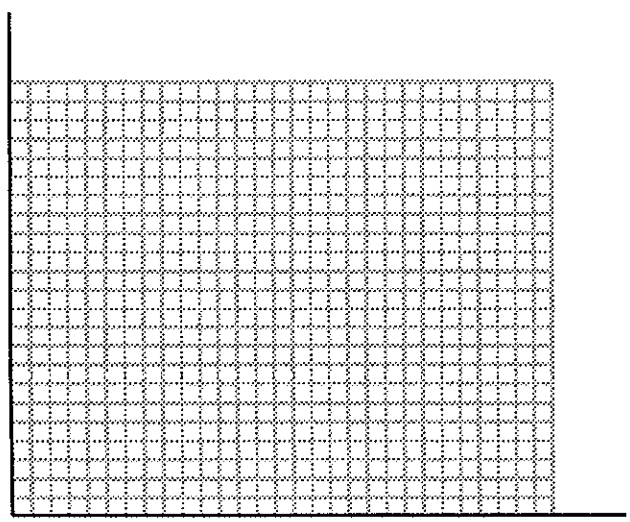
ACTIVITY SHEET 2
DATA SHEET

Initial length of the spring ________________________________

TRIAL	MASS	LENGTH OF SPRING	DISPLACEMENT
1			
2			
3			
4			

GRAPH

D I S P L A C E M E N T



WEIGHT

Two points on the line of best fit are: (________ , ________) (________ , ________)

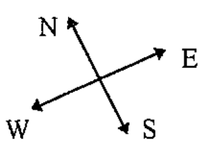
Compute the slope of the line.

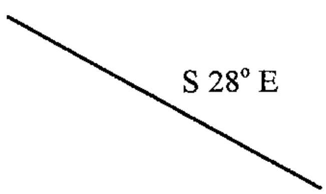
A Surveyor's Problem

Diane McGowan

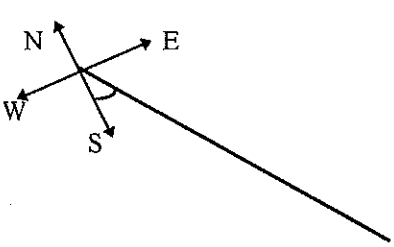
In their semester project my calculus students are required to interview a professional who uses mathematics in his or her occupation. They are asked to learn the requirements for the profession and the mathematics studied, and to present a problem that the professional has solved and that requires the use of mathematics from calculus or precalculus. Surveyors are very often interviewed. The surveyor's plat that appears on the activity sheet was presented by a student. Since that presentation, I have used the problem in my precalculus classes. The prerequisites are that the precalculus student must be familiar with the Law of Cosines, know how to determine the area of a triangle using two sides and the included angle, and know how to use Hero's formula to determine the area of a triangle.

Before the problem may be presented the teacher must define what is meant by the angle notations on the plat. The plat shows the relationship of the property's boundary line to the North-South line which also must be shown on the plat. Draw this figure on the board.





The North-South line must be drawn at an end point of the line segment to determine which angle is 28 degrees.



S28°E means that the angle is 28 degrees east of the South ray. The angle marked on the figure is the angle which measures 28 degrees.

To practice this concept the teacher may ask the students to determine the angles of the triangle in Figure 1.

The solution is as follows:

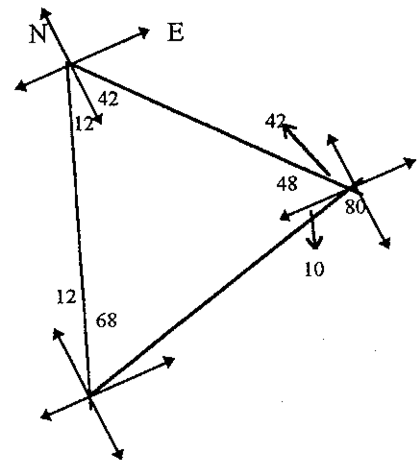


Figure 1

$m\angle X = 54°$ $m\angle Y = 58°$ $m\angle Z = 68°$

The students are now prepared to determine the area of the plat of land shown in Figure 2.

Solution:

Determine the measures of angles A and C .

$m\angle A = 38° 45' + 29° 11' = 67° 56'$

$m\angle C = 35° 7' + 59° 26' = 94° 33'$

Determine the measure of segments BE and BD using the law of cosines.

$BE^2 = 72.44^2 + 39.44^2 - 2(72.44)(39.44)\cos 67° 56'$

BE = 68.23 feet

$BD^2 = 129.00^2 + 44.30^2 - 2(129.00)(44.30)\cos 94° 33'$

BD = 139.67 feet

The area of triangle ABE =

$0.5(72.44)(39.44)\sin 67° 56' = 1323.87 \text{ ft}^2$

The area of triangle BCD =

$0.5(129.00)(44.30) \sin 94° 33' = 2848.35 \text{ ft}^2$

The area of triangle BED may be found using Hero's formula.

$$s = \frac{68.23 + 139.67 + 163.79}{2}$$

The area of triangle BED =

$$\sqrt{s(s-68.23)(s-139.67)(s-163.79)} = 4719.03 \text{ ft}^2$$

The total area is

$1323.87 + 2848.35 + 4719.03 = 8891.25 \text{ ft}^2$

THE SURVEYOR'S PROBLEM
ACTIVITY SHEET

FIGURE 1

Determine the angles of the triangle XYZ.

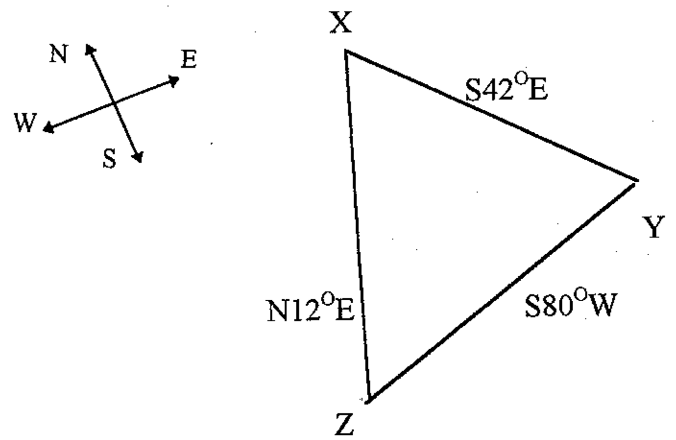
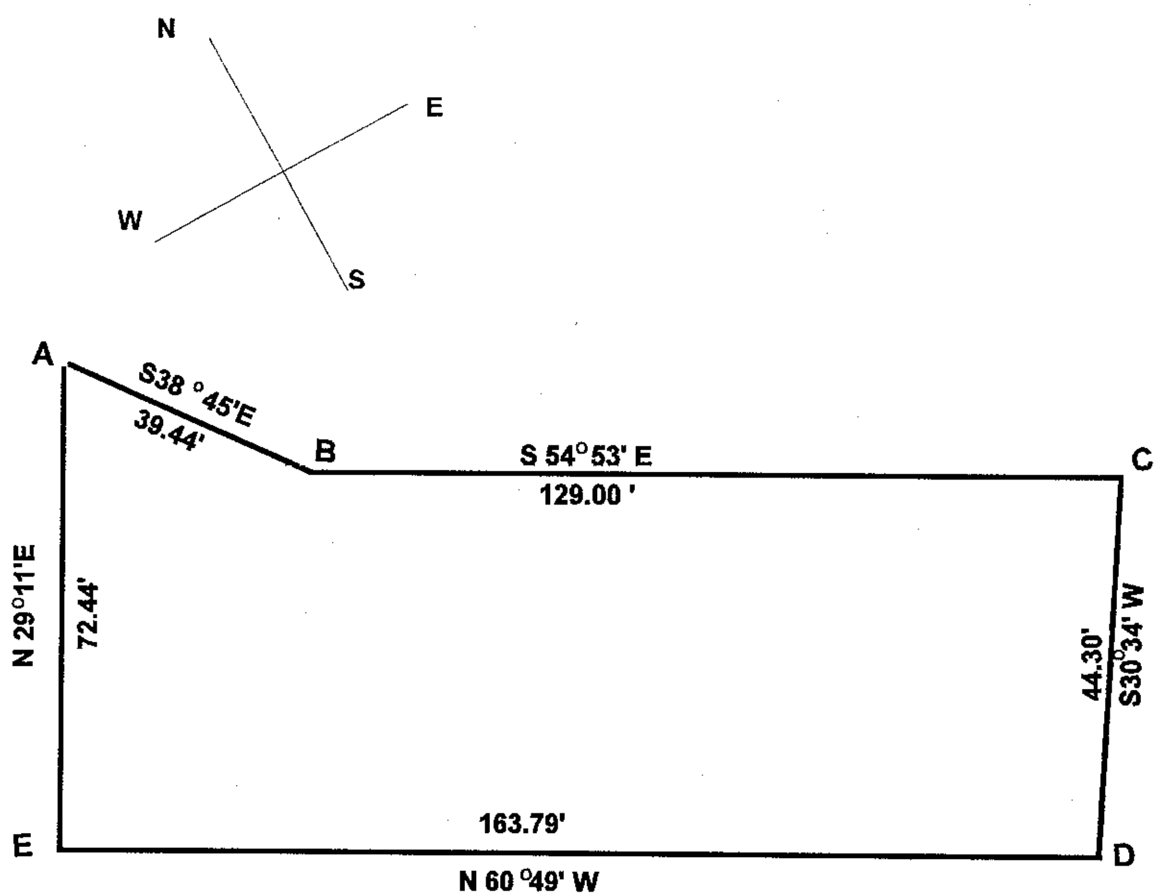


FIGURE 2:

Determine the area of the land plat.



Coordinate Geometry Bingo

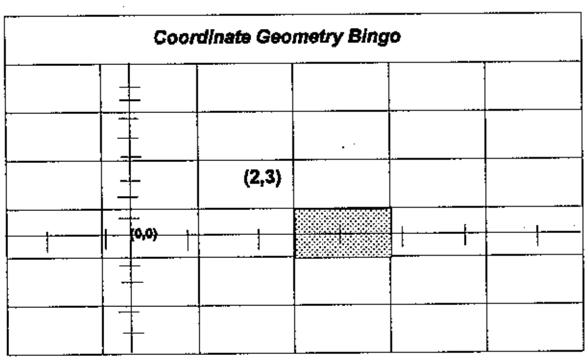
Kevin Kralicek
Student, James Bowie High School
Austin, TX

Coordinate geometry (CG) bingo can be played with any number of players, and requires that players know how to plot points on a coordinate graph. Each player receives a card and a pen or pencil. The origin can be moved in any direction around the card, so that an indefinite number of card types can be made and used.

IMPORTANT: Make sure the points do not fall on a grid line!!!

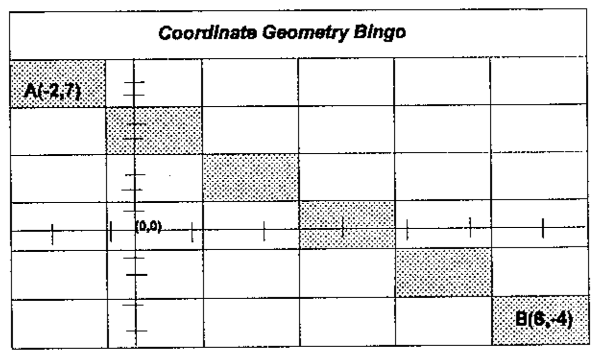
RULES OF THE GAME

The caller picks a set of coordinates out of a drawing box or hat, and calls it out. The players then plot the point and can fill or "black out' the square in which the point falls. For example, if the caller calls out point (2,3), then the third row, fourth column square is blacked out. The rules of common Bingo apply: a player must get six squares in a straight line to win.



VARIATIONS AND ADDITIONS TO THE GAME

1. The player must have more than one point plotted in a square in order to "black out" that square.
2. When the player calls a Bingo, he or she must find the slope of the line from the coordinates of the two farthest points of the line (in the case of this particular CG Bingo card, AB). The player can also be made to calculate the length of AB.



Encourage your students to contribute games, computer or calculator programs, geometric or algebraic activities, or original problems to the journal.

Coordinate Geometry Bingo

E. Glenadine Gibb Award TCTM Leadership Award

TCTM has begun a new awards program to honor those who have contributed to the enrichment of mathematics education in Texas and in the nation. The first awards were presented at the CAMT banquet on August 4 in San Antonio. Dr. Iris Carl was presented the E. Glenadine Gibb Achievement Award. This award is named in honor of Dr. Gibb who was the first Texan to be president of the National Council of Teachers of Mathematics and was a professor of mathematics education at the University of Texas at Austin. Dr. Carl has served as president of National Council of Teachers of Mathematics and as president the National Association of Supervisors of Mathematics. Since her retirement from Houston ISD she serves as an educational consultant for various groups in Washington, D.C. As NCTM president Iris began a campaign of communication to reeducate society for a curriculum that provides equal access to quality mathematics education for all students. Iris was nominated by two different TCTM members, who describe her as a person who brings prominence and recognition to mathematics education and to Texas.

Mary Alice Hatchett, Region XIII consultant, was awarded the first Texas Council of Teachers of Mathematics Leadership Award. Mary Alice was nominated by the Austin Area Council of Teachers of Mathematics. She was honored for her contributions to the mathematics teachers of Central Texas and the state. She has served as an A^2CTM officer for many years. Mary Alice has been a resource to the teachers of Region XIII by her design of innovative staff development, Making Mathematics Memorable, and her support of mathematics activities for teachers of all levels. Her nominator describes her as having the ability to take a mathematics concept and extend it from kindergarten to high school. She constantly studies mathematics publications and attends workshops to stay current in new methods and to pass this knowledge on the teachers of Region XIII. She has been the mentor of many teachers who have become workshop presenters and continue to look to her for guidance.

TCTM will continue this program with awards to be presented at the CAMT banquet in August of 1996. The E. Glenadine Gibb Award is presented to someone who is nominated by a TCTM member and who is to be honored for his or her contribution to the improvement of mathematics education at the state and/or national level. The TCTM Leadership Award will be presented to someone who is to be honored for contributions at the local and state level, who has designed innovative staff development and lessons and who has promoted the local mathematics council. The person must be nominated by a local NCTM affiliate. Nomination forms will be available in the spring TCTM newsletter.

1995 Prentice Hall and TCTM Scholarships

Simon & Schuster, the publishing operation of Viacom Incorporated, again presented TCTM with $2000 to be awarded to seniors who are pursuing careers as secondary mathematics teachers. TCTM added $1000 to this fund so that three students were awarded scholarships. Students were nominated by TCTM members using the form included in the spring newsletter. The scholarship winners were announced at the 1995 CAMT breakfast. The application for 1996 scholarships will be available in January, 1996.

Members who wish to nominate a student should send a request for the application with a stamped addressed envelope to Diane McGowan, 4511 Langtry Lane, Austin, Texas, 78749-1674.

The 1995 scholarship winners were

Erika Holt, James Bowie High School, Austin (nominated by Dr. Lloy Lizcano)

Erika is a the daughter of mathematics teacher Nancy Holt and technology teacher David Holt. She plans to attend the University of Texas at Austin. Erika has always wanted to be a teacher and says that "Teachers empower their students with the ability to succeed. This make educators precious. I anxiously await the day I will join such a noble profession."

Kendall Renee Roehl, Stroman High School, Victoria (nominated by Shirley Roehl)

Kendall is also the daughter of a mathematics teacher, Shirley Roehl. She plans to attend Sam Houston State University. Kendall writes, "I have been blessed to have had well-educated and caring individuals as teachers. They have always been helpful, reliable, trustworthy and willing to go the extra mile for any of their students. I want to give that back to the education system."

Portia Rosiere, B. F. Terry High School, Rosenberg (nominated by Jeanne Koonce)

Portia describes her participation in the Peer Assistance and Leadership program working with second graders. "I was not tutoring them in math as much as in confidence." Jeanne Koonce described her participation in a new class offered at her high school, the B.E.S.T.T. class (Bridging the Educational Scene for Teachers of Tomorrow). The class was designed to enlighten and encourage interested students by allowing them to observe and actually participate in teacher situations. Jeanne writes that she observed "her patience with students, her willingness to work, and her personal standards of achievement."

The Texas Curriculum Coalition

The Texas Curriculum Coalition is an organization of associations that seeks to create linkages among the disciplines and to provide a forum for greater collaboration among the associations with a focus on improving curriculum and instruction. The purpose is to strength the voice of curriculum associations and to coordinate efforts designed to improve teaching and learning. The first meeting of the association was in June , 1994. The members of the association are: Coalition of Reading and English Supervisors of Texas (CREST); Texas ASCD Fine Arts Network; Texas Association for Health, Physical Education, Recreation, and Dance; Texas Association for Supervision and Curriculum Development; Texas Association for the Gifted and Talented; Texas Association of Administrators and Supervisors of Programs for Young Children; Texas Association of Supervisors of Mathematics; Texas Council for the Social Studies; Texas Council of Teachers of English; Texas Council of Teachers of Mathematics; Texas Counseling Association & Texas School Counselors Association; Texas Foreign Language Association; Texas Music Educators Association; Texas Social Studies Supervisors Association; Texas Speech Communication Association; Texas Staff Development Council; and Texas State Reading Association. The Coalition staff monitors the legislature, the state school board, and TEA meetings and provides updates to the coalition members. By a vote of the board members TCTM joined the coalition in December of 1994. Our current Government Relations Representative, Dr. Kathy Mittag and Vice President Mary Jane Smith are TCTM representatives on the coalition. Dr. Mittag presents the following report on the first meeting of the 1995 school year.

The Texas Curriculum Coalition had its first meeting for 1995-1996 Monday, September 11 in Austin. Kathleen Mittag represented the Texas Council of Teachers of Mathematics. A report was given on the State Board of Education's September meeting. Expectations from the Curriculum Coalition for our organizations were discussed. Several of the expectations were to work and support issues that involve mathematics education as well as other disciplines, be involved with Connections in clarifying essential knowledge and skills, influence legislation, collaborate, strengthen status of mathematics in relation to the whole curriculum, be more proactive, work with others to benefit the whole child, monitor events in Austin and receive advance knowledge, gain and discuss information, have a voice in teacher preparation programs and in staff development, and garner support for mathematics' issues. I have received information concerning the Connection Team's work, rules for curricular and extracurricular activities, adoption processes comparison of proclamation 1994 and proclamation 1995, agenda for October SBOE meeting, discussion of Proposed new 19 TAC Chapter 66, proposed open-enrollment charter guidelines, student assessment rules, and long-range plan for public education 1996-2000. If anyone would like to receive copies of these documents, contact Kathleen Mittag, 210-691-5851 or kmittag@lonetar.jpl.utsa.edu.

Presidential Awards for Excellence in Science and Mathematics Teaching 1995 State Awards

TCTM is proud to honor the state winners in the National Science Foundation's program to recognize excellence in the teaching of mathematics. The awards are presented at the annual Conference for the Advancement of Mathematics. The national awards in secondary and elementary teaching had not been announced when the journal went to press. This information will be presented in the next journal.

Secondary Awards

Cindy Boyd, Abilene High School, Abilene, teacher of geometry and algebra

Cindy has taken a very active role in her local council and on the national level as NCTM Regional Services Representative Southern Region 2. She has taken a leadership role in many curriculum activities at the state and local level such as her chairmanship of the Algebra Task Force and her work on the Algebra Exit Test advisory committee. She is a speaker and staff development presenter and has been a trainer for many of the Texas Math Staff Development modules. She is the author of *Skit-So-Phrenia! Books 1-12*.

Jimmie Rios, Kirkpatrick Middle School, Fort Worth, Texas , teacher of mathematics grade 6 and algebra

Jimmie has been a video demonstration teacher for the PBS Middle School Mathematics Project and Texas Cable Teacher of the Year. He has served on the NCTM Committee for the Comprehensive Mathematics Education of Every Child and the PBS Mathematics Advisory Committee. He has made many staff development presentations to promote the NCTM standards and effective teaching practices.

G. T. Springer, Alamo Heights High School, San Antonio, teacher of geometry, and calculus

G.T. has participated in intensive training in incorporating technology into the Advanced Placement Calculus Curricula. She shares this information through her presentations on calculus. She has a special interest in chaos and fractals and participated in a symposium on Chaos, Fractals, and Dynamics at the Fermi Lab near Chicago. She has been a sponsor of Mu Alpha Theta, the honors mathematics organization for high school mathematics students.

Elementary Awards

Sydney Jo Brobst, Glen Cove Elementary, El Paso, teacher of a multiage class for 6-, 7-, and 8-year olds

Sydney's curriculum activities include serving on the Alternative Assessment Writing Team for her school, acting as a mentor for multiage grade level teachers, and involvement with the Family Math program. She has been a frequent presenter of staff development including a session on writing and publishing with children, multiage grouping, the gifted child in the multiage classroom, and using cuisenaire rods.

John Alton Elmer, Jr., Fisher Elementary, Pasadena, teacher of grades K-5.

John works with the HOSTS program and is a support teacher at his school. He is national AIMS trainer and has made many presentations including those on family math, probability and statistics, hands-on math and science, and taking chances with storytime.

Polly Haynes, Kyle Elementary School, Kyle, chapter I Math Improvement Grades 1-3

Polly has been a Chapter 1 Math Improvement Teachers since 1985. She has designed math lab activities to meet the growing needs of her campus. She has used At-risk adults to serve as tutors in her math lab. She is the author of *Money Math*, which teaches the beginning concepts of money for grades K-2. She has designed staff development presentations including "Mathematics is Not a Quiet Activity" and "Manipulating Our Vision, a Hundred Ways to Problem Solve."

Teachers are nominated for the awards by the completion of a nomination form contained in a brochure which may be obtained by contacting NCTM, 1906 Association Drive, Reston, VA 2201-1593, 703-620-9840. Nominations must be submitted by December 1, 1995. The nominated teacher will receive an application and then prepare a packet of materials for the state selection committee to review. Each of the state-level finalists receives the NSF State Award, which includes $750, and is honored at CAMT. A national committee reviews the application packets of the state-level finalists and recommends one from each group as the Presidential Awardee. The national awardees receive a $7,500 grant for their school, gifts from private sector donors, and an expense-paid trip for the awardee and guest to Washington, D.C. for the awards ceremony, meetings with leaders in government and education, and workshops to share ideas and teaching experiences.

Reports from NCTM Affiliated Groups

Reports are included from the councils who responded to a call for information on the local affiliated NCTM groups. We would like to have information from every council. If you have a report from your council to be included in this column, please send the information by December 1 to Diane McGowan, 4511 Langtry Lane, Austin, TX 78749-1674 or e-mail dmcgowan @ tenet.edu.

The **Austin Area Council's** first meeting was on September 12 at LBJ High School in Austin. Participants evaluated a new mathematics video from the local PBS station, participated in a statistics activity designed by Diane Butler of Lake Travis ISD, signed up for Tenet, or participated in a Geometry Sketchpad demonstration. A Geometer's Sketchpad users' group has been formed and plans to meet monthly. The November 14 meeting at the Region XIII service center will allow members to use the service center graphics lab, to participate in a multiplication activity designed by Mary Alice Hatchett, and to make operation balls as shown at the Make and Take Booth at CAMT.

Big Country Council's meeting on October 17 featured a Calculator-Based Laboratory demonstration by Frances Renfroe of Hardin-Simmons University. Members also discussed the logistics of their fall Mathematics and Science Tournament for grades 6-12 at Hardin-Simmons University. The contests were UIL practice sessions.

The **Rio Grande Council** held monthly meetings on August 7, September 11, October 2 and November 6.

Plans are being formed for the annual RGCTM conference on December 2 at Mercedes High School.

The **Texas South Plains Council** held meetings on September 25 and November 6 at the Educational Service Center in Lubbock. The November 6 meeting featured speaker Dr. Jesse Rudnick of Temple University, Philadelphia, Pennsylvania. The group co-sponsored the Panhandle Area Conference for Math and Science Teachers at West Texas A&M University at Canyon Texas, on Saturday, September 30, from 8 a.m. to 4 p.m.

The **Panhandle Area Council** co-sponsored the Panhandle Area Conference for Math and Science Teachers at West Texas A&M University at Canyon, Texas.

The **Texoma Council** met October 28 with a discussion on the Technology Conference, Tenet, Smart Lab Tour, and software reviews. Plans are being made for the spring conference on March 9, 1996.

Texas Affiliated Groups by Region

The name and address of the contact person for the local NCTM affiliated groups are given in this list. This information is provided so that TCTM members may contact the local council and participate in the local organizations activities. If a contact person with address is not given for your council, please send the most recent information to Diane McGowan by December 20 so that it may be included the next journal. If your council has an e-mail contact which should be included in the next journal, please send that information. The * by the council name indicates that the council sent a representative to the NCTM-TCTM Leadership conference in San Antonio July 31 and August 1.

SOUTHWEST REGION Service Centers 1, 15, 18, 19, 20

Alamo District Council of Teachers of Mathematics
  Ben Freeman ESC 20
*Greater El Paso Council of Teachers of Mathematics
  Jose Avalos
*Rio Grande Valley Council of Teachers of Mathematics
  Nora Munguia, Rt. 1 Box 143M, Mission, TX, 78572
*San Angelo Council of Teachers of Mathematics
  Kathryn Lowe, 4105 Meadowlark, San Angelo, TX 76901
West Texas Frontier Council of Teachers of Mathematics
  Sally Rucker

SOUTHEAST REGION Service Centers 2, 3, 4, 5, 13

*Austin Area Council of Teachers of Mathematics
  Linda Shaub, 3800 Baggins Cove, Austin, TX 78739 e-mail LShaub@tenet.edu
Gulf Coast Council of Teachers of Mathematics
  Merry Brown
Fort Bend Council of Teachers of Mathematics
  Patricia Beck
*Houston Council of Teachers of Mathematics
  Jacqueline Y Phillips-Haynes, 6730, Glen Rock, Houston, TX 77087
San Jacinto Council of Teachers of Mathematics
  David Arniger
Spring Branch Council of Teachers of Mathematics
  Kathy Menotti
*1960 Area Council of Teachers of Mathematics
  Michelle Pollard, 15903 Cutten Road Houston, TX 77070

NORTHWEST REGION Service Centers 9, 11, 14, 16, 17

*Big Country Council of Teachers of Mathematics
  Kathy Dacy, 1149 Albany, Abilene, TX 79605 e-mail Kdacy @ tenet.edu
Fort Worth Council of Teachers of Mathematics
  Veronica Meeks
North Texas Council of Teachers of Mathematics
  Cathy Banks
*Panhandle Area Council of Teachers of Mathematics
  Patricia Maupin, 3420 South Coulter #914, Amarillo, TX 79109
*Texas South Plains Council of Teachers of Mathematics
  Monterey High School, 3211 - 4th Street, Lubbock, TX 79413 or e-mail billa@tenet,edu
*Texoma Council of Teachers of Mathematics
  Claude Kim Bell, 4509 McNiel, Witchita Falls, TX 76308

NORTHEAST REGION Service Centers 6, 7, 8, 10, 12

East Texas Council of Teachers of Mathematics
  Roy McLain
*Greater Dallas Council of Teachers of Mathematics
  Carol Lipton, 10662 Royal Springs Drive, Dallas, TX 75229 or e-mail obrame@tenet.edu
Trinity-Brazos River Valley Council of Teachers of Mathematics
  Mary Selcer
*Red River Council of Teachers of Mathematics
  Alice Young, 105 E. Runnels, New Boston, TX 75570

Calendar

Information has been included from the affiliated groups who have responded to requests for meeting dates and council activities. If you would like to have your group's information included in the next journal, you must send the information by December 20 to Diane McGowan, 4511 Langtry Lane, Austin, TX 78749-1674 or e-mail dmcgowan @tenet.edu.

December 2
: Rio Grande Council of Teacher's of Mathematics Conference
: South Texas High School, Mercedes

January 8
: Monthly meeting of Rio Grande Council of Teacher's of Mathematics

January 20
: Big Country Council of Teacher's of Mathematics-
: Meeting Speaker: Linda Shaub, Austin ISD, Spatial Visualization

February 3
: Austin Area Council of Teacher's of Mathematics Spring Conference
: 8:30-3:30 p.m.
: Sessions for Elementary, Middle, and High School mathematics teachers

February 5
: Monthly meeting of Rio Grande Council of Teacher's of Mathematics

March 9
: Texoma Council of Teachers of Mathematics Spring Conference

April 25-28
: National Council of Teachers of Mathematics national conference, San Diego, California

July 31-August 2
: Conference for the Advancement of Mathematics Teaching, Dallas

NCTM Leadership Conference

Linda Shaub
Austin Area Council of Teachers of Mathematics

The NCTM Leadership Conference hosted by NCTM and TCTM held on July 31-August 1 in San Antonio was an excellent opportunity for networking the affiliated groups of Texas. The conference was attended by representative of 11 affiliated groups and representatives from TASM and TCTM. Many ideas were shared. NCTM provided the hotel accommodations and TCTM provided help with transportation expenses for the 30 participants. The purposes of the conference were to familiarize participants with the structure of NCTM and with the services provided by NCTM to affiliated groups, to review the responsibilities of the affiliated groups, to facilitate the exchange of ideas, and to encourage participants to evaluate the current goals of their affiliated group, set new goals, and develop action plans. The members were welcomed by Jack Price, NCTM president, and Ginnie Bolin, outgoing Regional Service Representative for Southern Region 2. Beverly Williams, NCTM Conventions and Conferences committee member, Virginia Williams, NCTM staff member, and Paul Trafton, NCTM board member, shared national concerns and opportunities with the affiliated groups. Cindy Boyd was welcomed as the new Regional Services NCTM representative for Southern Region 2 and helped facilitate discussions of successes and concerns.

One of the main goals of the conference was to form cooperative efforts of the Texas affiliates to be a positive force in the determining the issues relating to mathematics education. Each participating group shared key activities such as mini-conferences and math contests, membership drive ideas, and methods of funding such activities. Participants worked together to generate the key components of good leaders, ways to fund speakers for miniconferences, and solutions to communication and membership drive problems. TCTM president Diane McGowan asked that the affiliated groups communicate with each other via The Texas Mathematics Teacher by contributing information on their activities, dates for the calendar section, and classroom activities to be included in the journal. All affiliated groups were urged to accept the responsibility of becoming a political force in their region by publishing position papers and being a voice heard by school boards and TEA.

Texas Council of Teachers of Mathematics

Last Name	First Name	School	(Leave Blank)
Street Address	City	State	Zip

Dear Teacher,
To ensure continuous membership, please print your name, zip code,and school above. Enclose this card with your check for $10.00 for one year payable to T.C.T.M. and mail to:

Barbara Polnick
Treasurer
#3 Ridgeway Rd., Woodgate Place
Conroe, TX 77303

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Cut on dotted line

Journal contributions must be mailed by December 20 to be included in the next journal.

Please note that the TCTM board voted to increase the dues to $10 to support the journal, government relations activities, CAMTerships, student scholarships, leadership conference, and the continued involvement of TCTM in the mathematics activities in Texas and the nation. This change is effective on November 1, 1995.

TEXAS COUNCIL OF TEACHERS OF MATHEMATICS

Affiliated with the
National Council of Teachers of Mathematics
1995-1996

Cut out your TCTM membership card.
Please note the expiration date on your mailing label.
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Texas Council
of Teachers of Mathematics

Member 1995-1996

NAME ______________________

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